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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/588,645

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EXAMINER

LI, JUN

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1732

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/588,645	Applicant(s) LIMBECK, UWE	
	Examiner JUN LI	Art Unit 1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 May 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In the instant case, there is no description support for the starter battery has an output sufficient "only" to supply electrical power to components necessary for the supply of reactants to the fuel cell stack until in the fuel cell itself generates electrical power.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In the instant case, claim 16 recites the limitation "the original temperature. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. Claim 1-3 and 5-6, 12, 16 are rejected under 35 U.S.C. 103(a) as obvious over Rock et al (EP1113516A1) in view of Reiser (US2004/0157094) and Yang (US2003/0203258).

Rock et al teach a method to cold start a solid polymer membrane fuel cell wherein oxygen and hydrogen are supplied to the cell so that the reacted fuel causes the fuel cell to heat up from subfreezing temperature([0005], [0006],[0013], clms, Fig). Rock further teaches a high temperature (about 80°C, or at least 0 °C) can be reached via heating a fuel cell stack to a temperature of at least about -20°C at which electrical current can be drawn from the stack. Rock also discloses heating the coolant with a combustor and circulating the coolant through the stack and after the fuel cell stack reaching a preset temperature the heating of the coolant is discontinued ([0013]).

Regarding claim 1-3, 5 and 12, 16, Rock is silent about using the power from the fuel cell to operate the heating device as well as the coolant pump.

Reiser teaches using electric power generated by fuel cell to melt frozen coolant water in the accumulator of the fuel cell stack wherein the heater is powered by electricity generated by the fuel cell stack ([0005], [0006], Fig. 1, [0031]-[0035]).

It would have been obvious for one of ordinary skill in the art at the time of invention filed to adopt such electric power generated by fuel cell to power the heater as suggested by Reiser to modify the cold starting method of Rock because by doing so

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can help in reducing the time required to provide coolant water internally for a fuel cell stack which is started up from at least a partially frozen state, and increasing the amount of power which maybe extracted from a fuel cell stack when initially started up from a frozen state without localized overheating the fuel cell stack as suggested by Reiser ([0005]).

Yang teaches the electricity drawn from the fuel cell stack can be used to recharge the battery which supplies electricity to coolant pump (item 210), cooling fan (item 215), blower (item 206), solenoid valve (246) etc during fuel cell start up and the control circuit (item 244, Fig 2) as soon as the fuel cell system (item 200) is properly started ([0028]-[0033], Fig. 2). Yang also discloses air can be supplied to the system via a blower and hydrogen can be selectively supplied under the control of solenoid valve controlled by a control circuit ([0021], [0024]) wherein such blower and solenoid valve, control circuit are all energized by a starter battery which can then be recharged by the fuel cell electricity once the fuel cell is properly started ([0033]). Yang also discloses a backup battery set maybe incorporated in the fuel cell system for powering the control circuit in control circuit in starting up the fuel cell system. Yang also teaches this backup battery power is also supplied to other devices , such as the blower, pump, the cooling fan etc auxiliary for the startup operation and once the fuel cell system is properly started, electricity supplied from the fuel cell stack recharges the backup battery set ([0033]).

It would have been obvious for one of ordinary skill in the art at the time of invention filed to adopt power generated by fuel cell stack to operate the coolant pump,

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cooling fan etc as shown by Yang to modify the fuel cell startup process of Rock because by doing so can produce a fuel cell stack with large working current which can be used successfully in electric vehicles and small sized electrical generators as suggested by Yang ([0013], [0034]). It would have been obvious for one of ordinary skill in the art to adopt such backup battery as shown by Yang to modify the fuel cell starting process of Rock because by doing so can help the fuel cell proper start up as suggested by Yang. As for the backup battery has sufficient output power, it is noted that Yang's disclosed battery is capable of only supplying power to auxiliary devices during fuel cell start up, thus dimensioned such that it has output only sufficient to supply power as claimed is thus expected.

As for the fuel cell output power adequate to operate the coolant pump and the heater, Rock in view of Reiser and Yang already teaches a substantially similar fuel cell starting up process including using power from the fuel cell to operate the coolant pump and the heater, thus such fuel cell output power adequate to operate the coolant pump and heater are expected.

Regarding claim 6, Rock in view of Reiser and Yang already discloses fuel cell generated power can be used to recharge the battery which can provide electricity during start up for running the coolant pump, the cooling fan etc, it would have been obvious for one of ordinary skill in the art to use such fuel cell electricity recharged battery to operate the burner because utilizing such rechargeable battery for operating the auxiliary devices, i.e. the burner, can help producing a fuel cell system with large current load as suggested by Yang.

2. Claim 4 is rejected under 35 U.S.C. 103(a) as obvious over Rock et al (EP1113516A1) in view of Reiser (US2004/0157094) and Yang (US2003/0203258) as applied above, and further in view of Edlund (US6495277).

Rock in view of Reiser and Yang is silent about the recited operating capacity.

Edlund teaches using a supplemental battery for the fuel cell processing assembly from an off to a start up mode wherein a control system (item 30) is used to control the amount of power drawn from the fuel cell stack (item 14) to prevent damage to the fuel cell stack (Fig 1, col 7 ln 57-67, col 8 ln 1-6).

It would have been obvious to one ordinary skill in the art to control the fuel cell capacity amount as shown by Edlund to practice fuel cell system of Rock in view of Reiser and Yang because controlling the fuel cell capacity at a proper amount will help prevent fuel cell damage as suggested by Edlund. Furthermore, one of ordinary skill in the art would have been obvious to operating such fuel cell at a probable capacity via routine optimization (See § MPEP 2144.05 [R-5] II).

3. Claim 7 and 9 are rejected under 35 U.S.C. 103(a) as obvious over Rock et al (EP1113516A1) in view of Reiser (US2004/0157094) and Yang (US2003/0203258) as applied above, and further in view of Amrhein (US2003/0124399).

Rock in view of Reiser and Yang is silent about the burner is operated by hydrogen and the burner is a gas burner.

Amrhein teaches using residual hydrogen from fuel cell unit to operate the burner with improved total energy efficiency of the fuel cell apparatus ([0023], [0041]).

It would have been obvious to one ordinary skill in the art to adopt the hydrogen to operate the burner as taught by Amrhein to practice the burner of Rock in view of Reiser and Yang because using hydrogen operating the burner can help utilize the residual hydrogen fuel from fuel cell thus improve the energy efficiency as suggested by Amrhein. It is to be noted that a hydrogen burner is already a gas burner and one of ordinary skill in the art would have been obvious to choose an efficient gas burner such as a high-performance gas burner as recited in the instant claims to improve the energy utilization efficiency.

4. Claim 8 and 10-11 are rejected under 35 U.S.C. 103(a) as obvious over Rock et al (EP1113516A1) in view of Reiser (US2004/0157094) and Yang (US2003/0203258) as applied above, and further in view of Bloomfield(US3976507).

Rock already teaches an air compressor (Fig, [0015]) wherein supplying oxygen to the fuel cell.

Regarding claim 8 and 10-11, Rock in view of Reiser and Yang is silent about using same compressor to supply air for both burner and fuel cell and the adjusting the ratio of the air.

Bloomfield teaches using a compressor (item 40) supplying air to both fuel cell stack (item 12) and a burner (item 20) via an air control box (item 48), a certain volume ratio of air supplied to fuel cell stack and burner respectively (Fig 1, col 3 ln 52-65, col 5 ln 1-5) wherein the air supplied to the burner can help providing energy for driving the compressor while the air supplied to the fuel cell stack can help producing electricity.

It would have been obvious to one of ordinary skill in the art at the time of invention filed to one compressor for supplying air to both fuel cell stack and burner via an air box controller to help producing electricity from the fuel cell stack and to provide enough energy from the burner for driving the compressor as shown by Bloomfield (col 3 ln 52-65, col 5 ln 1-5). Furthermore, one of ordinary skill in the art would have been obvious to adopt a proper air volume ratio between burner and fuel cell stack such as recited in the instant claims via routine optimization (See § MPEP 2144.05 [R-5] II).

Response to Arguments

Applicant's arguments filed 05/02/2011 have been fully considered but they are not persuasive. In response to applicant's assumption about Rock requires a battery, it is noted that the Applicant has yet to provide any factual evidence in support of the such allegation. In response to applicant's arguments about the Reiser disclosed power drawn from the fuel cell is used to operate an electric heater instead of combustor, Reiser is applied to show that power drawn from the fuel cell can be used to operate cooling pump and heater while instant claim 1 does not require heater to be a combustor. Furthermore, Rock already disclose the heater being a combustor while Yang also discloses electricity drawn from the fuel cell can be used to charge the battery which can then supply power to auxiliary device for supplying air, hydrogen as discussed above. Thus power drawn from fuel cell used to operate the auxiliary device such as driving air/hydrogen to the combustor is thus well within the scope of one ordinary skill in the art in view of the applied references. It is also noted that the

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test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

In response to applicant's arguments about the heating device does not heat the coolant by electrical power, it is noted that if applicant wants such limitation to be considered, it has to be claimed based on description support of original disclosure.

In response to applicant's arguments about Yang not disclosing power drawn from the fuel cell being used to operate the coolant pump and heater, it is noted that Reiser already disclose such limitation. It is noted that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JUN LI whose telephone number is (571)270-5858. The examiner can normally be reached on Monday-Friday, 9:00am-5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JUN LI/
Examiner, Art Unit 1732
06/03/2011

/Melvin Curtis Mayes/
Supervisory Patent Examiner, Art Unit 1732